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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,354	09/11/2001	Gerhard Olbert	49845	3616
26474	7590	03/01/2004	EXAMINER	
KEIL & WEINKAUF 1350 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036			MCHENRY, KEVIN L	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/936,354

Applicant(s)

OLBERT ET AL.

Examiner

Kevin L McHenry

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-21 is/are pending in the application.
- 4a) Of the above claim(s) 20 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/6/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 12-19, drawn to a multitube reactor.

Group II, claim(s) 20 and 21, drawn to methods of reaction.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Claim 1 is either obvious over or anticipated by Ruppel et al. (see U.S.P. 5,821,390; particularly Figure; column 2, lines 3-19; column 6, lines 3-12). Accordingly, the special technical feature linking the two inventions (i.e. a multitube reactor with 10,000 to 50,000 catalyst tubes within an outer wall, a means for introducing and discharging a heat transfer medium, and a tube spacing to tube diameter ratio) does not provide a contribution over the prior art. Therefore, there is no unity of invention and lack of unity is held by the examiner.

3. During a telephone conversation with David Liechty on 19 February 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 12-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20 and 21 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Specification***

5. The disclosure is objected to because of the following informalities:

The specification is single spaced.

The specification should include headings, such as "Background of the Invention", "Summary of the Invention", "Brief Description of the Drawings", and "Description of Preferred Embodiments".

On page 4, line 2, the specification refers to the claims.

On page 8, line 4, fourth is misspelled.

On page 10, line 21, fourth is misspelled.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 12 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Ruppel et al. (U.S.P. 5,821,390).

Ruppel et al. teach a multitube reactor with a catalyst tube bundle arranged within an outer wall. The tube bundle includes 5000 to more than 40,000 tubes. The reactor has means for introducing and discharging a heat transfer medium that flows around the catalyst tubes. The tubes have a length of 2-4 m. Ruppel et al. teach that the ratio of tube spacing to the external diameter of the catalyst tubes is 1.1-2.1. The reactor is also divided in the longitudinal direction of the tubes into several zones so that heat transfer medium will have different temperatures in the different zones due to the transfer of heat (see U.S.P. 5,821,390; particularly Figure; column 2, lines 3-19; column 6, lines 3-12).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruppel et al. (U.S.P. 5,821,390) as applied to claims 12 and 19 above, and further in view of Westerman et al. (U.S.P. 4,894,205).

Ruppel et al. teach the reactor taught above in section 7. However, Ruppel et al.

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do not teach that the tube ratio changes with tube bundle diameter or a tube bundle diameter.

Westerman et al. teach a multitube reactor. Westerman et al. teach that the reactor will have a diameter of about 5 m while reactors with 5000 tubes have tube diameters of about 45 mm and reactors with 15,000 tubes have tubes with a diameter of about 25 mm. Therefore, Westerman et al. teach that the ratio of tube spacing to tube diameter increases with increasing bundle diameter for a given tube spacing (see U.S.P. 4,894,205; particularly column 1, lines 52-56).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the reactor of Ruppel et al. by the teachings of Westerman et al. One would have been motivated provide a proper tube bundle diameter for a multitube reactor, as taught by Westerman et al., and to provide the proper tube diameter for a given number of tubes, as taught by Westerman et al. One of ordinary skill would have been further motivated to follow these teachings to provide a reactor design that would have suitable heat transfer properties due to its bundle size and configuration.

10. Claims 12, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Groten et al. (U.S.P. 5,730,843) in view of Ruppel et al. (U.S.P. 5,821,390).

Groten et al. teach a rectangular multitube reactor (see U.S.P. 5,730,843; particularly Figure 2; column 5, lines 39-47).

Groten et al. do not teach ratios of catalyst tube spacings to their diameters.

Ruppel et al. teach a multitube reactor with a catalyst tube bundle arranged

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within an outer wall. The tube bundle includes 5000 to more than 40,000 tubes. The reactor has means for introducing and discharging a heat transfer medium that flows around the catalyst tubes. The tubes have a length of 2-4 m. Ruppel et al. teach that the ratio of tube spacing to the external diameter of the catalyst tubes is 1.1-2.1. The reactor is also divided in the longitudinal direction of the tubes into several zones so that heat transfer medium will have different temperatures in the different zones due to the transfer of heat. Ruppel et al. teach that this reactor design is beneficial for production of acrolein in a simple manner with reduced formation of hot spots (see U.S.P. 5,821,390; particularly Figure; column 2, lines 3-19; column 3, lines 50-63; column 6, lines 3-12).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the reactor of Groten et al. by the teachings of Ruppel et al. One would have been motivated to do so in order to provide a reactor design that was beneficial for production of acrolein in a simple manner with reduced formation of hot spots, as taught by Ruppel et al.

### ***Conclusion***

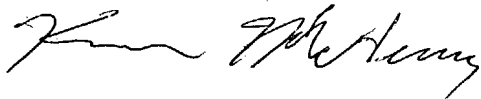
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bonk et al. (U.S.P. 6,296,814), Benton et al. (U.S.P. 5,227,556), Sunavala (U.S.P. 5,723,094), Duce et al. (U.S.P. 6,191,332), Kato (U.S.P. 6,296,679), and Woebecke et al. (U.S.P. 3,910,768) are cited of interest for illustrating the state of the art in reactor design.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin L McHenry whose telephone number is (571) 272-1181. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin McHenry

Kiley Stoner AU 1725  
Kiley Stoner 2/19/04